Actualités et nouveautés autour de Salome-Meca et code_aster
Changes in the team
Welcome to the new generation

- **New RCA : Nicolas SELLENET**
  - « Responsable Code_Aster », in charge of code_aster development process
  - *Best of luck to Josselin Delmas for his new position!*

- **New RSM : Guillaume DROUET**
  - « Responsable Salome-Meca », in charge of Salome-Meca development process and distribution
  - *Many thanks to Isabelle Fournier for her invaluable work!*

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**EDF**
Salome-Meca and code_aster today
A proven distribution model (1/4)

- Bringing to the users both mechanical solvers and skill modules in a unified SALOME environment

- Qualifying one and only software for structural mechanics in the engineering divisions of EDF
  - Salome-Meca 2016, including code_aster 12.6, is currently being qualified
A proven distribution model (2/4)

*code_aster*, nearly 30 years of development
A proven distribution model (3/4)

code_aster: what’s new?

- **Introduction of a validation repository**
  - Validation of physical models with respect to experimental data

- **Improvement of parallel verification**
  - 3,600 tests to validate code_aster in parallel

ALREADY MORE THAN 150 TESTS

MORE RELIABLE PARALLEL STUDIES
A proven distribution model (4/4)

**Salome-Meca: what’s new?**

- **Pre-operation of Salome-Meca 2016 at EDF**
  - Packaging done by EDF/DIPNN/SEPTEN, available in Calibre 9

- **Note of receipt of Salome-Meca [SV4.02.01]**
  - New automatic receipt procedure for code_aster and skill modules
A mature development model (1/6)

- **Aimed at reducing the time to market of R&D in code_aster**
  - One major code_aster version every two years, one stable and testing version every six months
  - Each major code_aster version brings additions to both generic features and advanced models

- **Built and focused on the SALOME platform for Salome-Meca**
  - Leverages the power of SALOME to offer integrated GUI and skill modules

- **In the next years, revolutions are coming to Salome-Meca, starting in 2017**
A mature development model (2/6)
Always at the service of the users

- By introducing new features
  - Model reduction
    - New commands
  - The LAC contact method
    - Currently being proof-tested in industrial studies
    - Parallel pairing
  - And many others
A mature development model (3/6)

**Always at the service of the users**

- **By improving performance**
  - Analysis phase of the MUMPS linear solver now parallel
    - Performance gain for parallel studies

- Acceleration of the opening of MED mesh files
  - Huge improvement for mesh with lots of groups of elements or nodes

**File opening time**

<table>
<thead>
<tr>
<th></th>
<th>V12</th>
<th>V13</th>
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<tbody>
<tr>
<td></td>
<td>15 minutes</td>
<td>3 minutes</td>
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**FACTOR 4**
A mature development model (4/6)

*Always at the service of the users*

- **By improving ergonomics**
  - Simplification of use for parallelism
    - Now limited to the model definition
  - Internal state variables now named
    - Instead of V1, V2, …
    - Command file easier to read…
    - Command file easier to write!

- code_aster v13 soon in operation
  - Provision of a translator v12 \( \rightarrow \) v13
A mature development model (5/6)

*Salome-Meca 2017: a lot of novelty*

- Release of code_aster 13.4 as stable version
- Update of SALOME base version from 7.8 → 8.3
- New skill modules
  - Salome-Meca now boasts almost 15 skill modules (there were none in 2007)
- Brand new GUI of code_aster: AsterStudy
A mature development model (6/6)

**New skill modules**

- **RSTE**
  - Thermal Equivalent Source calibration

- **ARCADE**
  - Reactor containment vessel creep parameter calibration

- **MoFEM**
  - Crack propagation with code MoFEM

- **MAP**
  - Calibration of behavior laws on material point
Three revolutions coming …
Towards international dissemination
code_aster and Salome-Meca expanding worldwide

- Documentation in English revamped and improved thanks to machine learning
  - Check it out!
  - More improvements to come in 2017

- International training sessions
  - Regular training workshops in the UK: next one coming in September
  - 1st open training in China held in February 2017

- Users day
  - 1st users day « abroad » held in the UK in June 2016
code_aster Professionnal Network: a community still growing

- 75 members, 17 countries
- A dozen of posters today
AsterStudy
AsterStudy now a reality (or the new trilogy of code_aster-SALOME)

- A long lasting history between Aster and SALOME
  - 2005 (episode 1): decision to bring code_aster and SALOME together
  - 2006 (episode 2): first demo
  - 2007 (episode 3): first complete study inside “Aster-SALOME”

- After three years in the making, a new trilogy can now be unleashed
Before

Preprocessing → Mechanical study → Postprocessing
After

AsterStudy

Preprocessing  →  AsterStudy  →  Postprocessing

Input settings
Launch and management of computations
Interaction with SALOME

Preprocessing
Postprocessing

Salome-Meca
Brand new GUI of code_aster (1/3)

**AsterStudy, an ongoing revolution**

- First release in Salome-Meca 2017

More information at 13:45!

Development of the beta version during 2016
Brand new GUI of code_aster (2/3)

*It’s only the beginning, there’s more to come*

- Old Aster module removed
- End of EFICAS use for definition of code_aster’s input file
- ASTK still available in 2017

2017

Unified GUI: Input file definition and management of computations

2018

- Uncertainty propagation
- Parameters calibration
- Computations interactif management

2019

- Graphical tools for study checking
- Major developments still to come
Brand new GUI of code_aster (3/3)

A collaborative work

- User input is paramount

- « With great input, come great responsabilities and duties »

- Collecting feedback from users is no less important
AsterHPC
Massively parallel calculations coming to structural mechanics

- **2013 : first Proof Of Concept**
  - Using a slightly modified code_aster
  - Non-linear thermo-mechanics with large strains
  - Capability to reach a thousand of cores with a decent speedup

- **2015 : second Proof Of Concept**
  - Using a completely revamped Object-Oriented version of code_aster
  - Capability to retain most of code_aster huge heritage in computational mechanics and studies

- **2016 : AsterHPC is born, collaborative work initiated**
PAMSIM : preparing the future of code_aster

- **PAMSIM**: Year 2 of collaborative project (2016-2018)

- **Goals**: code_aster **massively parallel and easy to use interoperability**

**Investissements d'Avenir**
Développement de l'Economie Numérique

« AAP Calcul Intensif et Simulation Numérique N°2 »

**PAMSIM**
PARallélisme Massif en SIMulation numérique pour la Mécanique

Cut mesh out of code_aster
Thank you !
Très belle journée des utilisateurs !